United States Environmental Protection Agency
Enforcement and Compliance Assurance (2201)
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EPA

Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Helen Kramer Landfill Site Profile

Site Description: An abandoned landfill and waste lagoons

Site Size: 90 acres

Primary Contaminants: Heavy metals and volatile organic compounds (VOCs)

Potential Range of Health Effects Prior to Site Cleanup: Liver and kidney disorders, increased risk of cancer

Nearby Population: 1,500 people within 1 mile

Ecological Concerns: Contamination of Edwards Run

Year Listed on NPL: 1983

EPA Region: 2

State: New Jersey

Congressional District: 2

Success in Brief

Largest Site in New Jersey Completed

The Helen Kramer Landfill in Mantua Township was once considered one of the nation's worst hazardous waste sites. Several million gallons of chemical refuse including oils, paints, and solvents were buried there, along with municipal, septic, and hospital wastes. Fifty feet thick in most areas, the wastes were dumped indiscriminately into an old sand and gravel pit.

Rain and melted snow caused heavy metals and chemical residues to leach into the underlying aquifer. Fortunately, local residents were on public water supplies, but the effects of environmental degradation included 11 acres of stressed vegetation that bore testiment to the area's inability to sustain wildlife.

Following a huge construction effort lead by the U.S. Environmental Protection Agency (EPA), New Jersey officials assumed responsibility for 30 years of monitoring and maintenance in May, 1994. Both EPA and the state are suing to recover more than $100 million in cleanup costs from potentially responsible parties, a list that reads like the Fortune 500.

The leachate pretreatment facility's main building shown here under construction on a clear day in October, 1990.

The Site Today

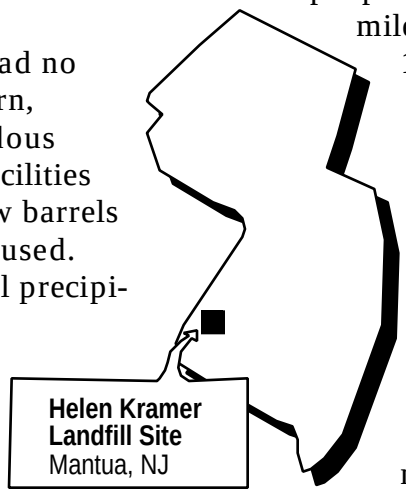
EPA completed construction of an 81.5-acre containment cap in November 1992, a massive project that required two million tons of soil and clay. An active gas collection and treatment system burns excess methane on a continuous flare. A treatment plant for leachate and ground water remains operational, filtering 120 gallons per minute. State officials are operating both systems as part of the overall monitoring effort.

A Site Snapshot

The Helen Kramer Landfill site is located in Gloucester County, five miles south of Woodbury, New Jersey. The original landfill of 66 acres bears the name of Helen Kramer, a widow in her 90s who still lives at the site boundary. In 1963, Mrs. Kramer apparently converted a sand and gravel operation into a more lucrative landfill for industrial wastes, some allegedly transported from Philadelphia by organized crime.

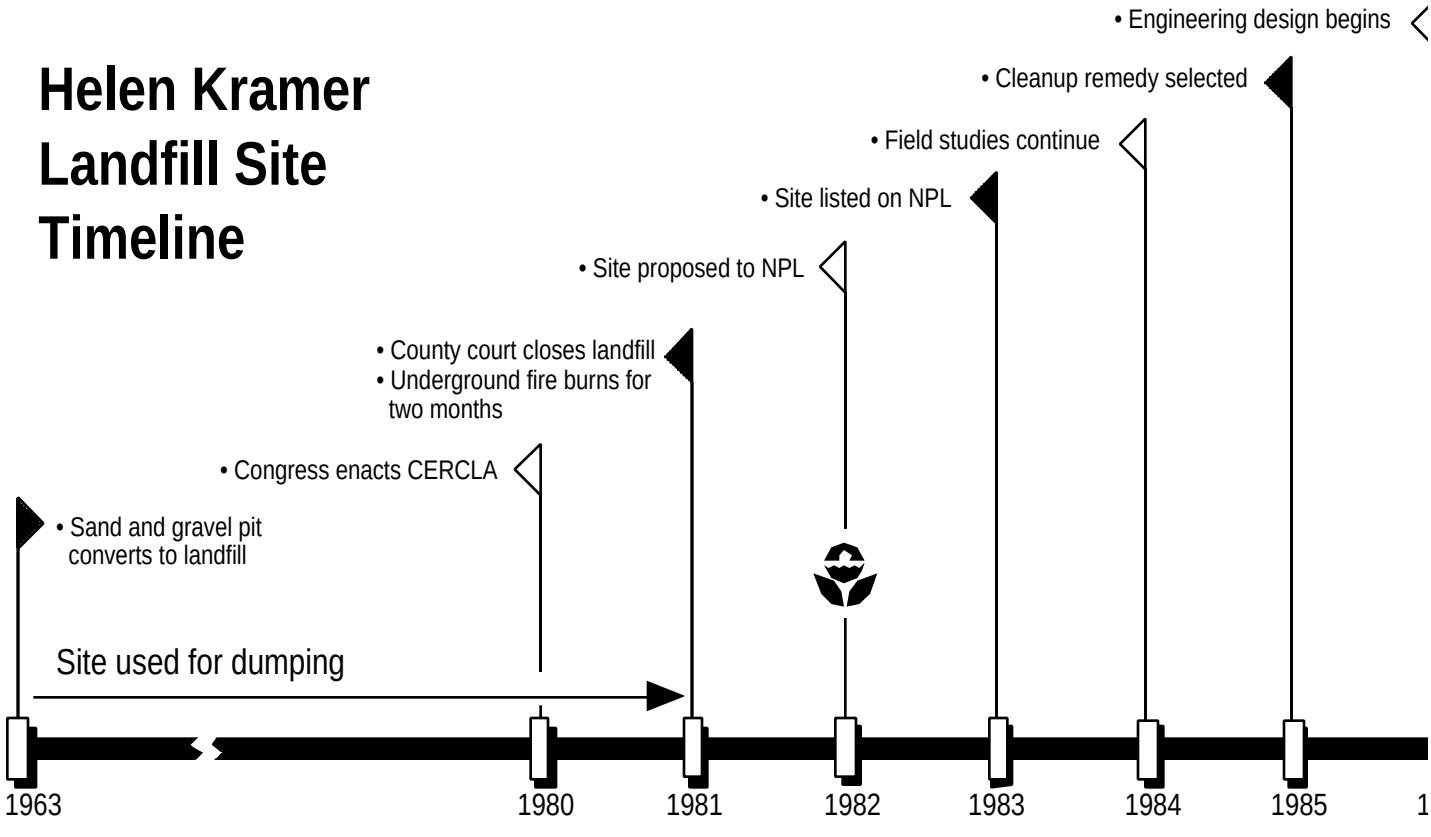
Over the ensuing years, municipal, septic, and hospital wastes added to the growing mix of oils, sludges, solvents, pesticides, plastics, and paints. By 1981, the landfill burgeoned with several million gallons of spent chemicals and more than two million cubic yards of rubbish. Three on-site lagoons harbored an ominous blend of liquid and sediments thoroughly saturated with heavy metals.

The sand pit had no liner as do modern, permitted hazardous waste disposal facilities today; indeed few barrels and drums were used. Through seasonal precipitation, toxic substances seeped into an underlying aquifer and contaminated Edwards Run, a tributary of Mantua Creek that leads to the Delaware River. The ground water was at a depth that prevented significant deterioration.



Approximately 1,500 people live within one mile of the site and 10,000 live within three miles. The landfill presented a fire and explosion hazard because of the buildup of methane gas, and airborne contaminants could be measured from miles away.

Helen Kramer Landfill Site Timeline



County, State, and Federal Agencies Cooperate on Massive Project

Industrial Chemicals Poison the Land

If you had ventured onto the site in the late-70s, a feeling of impending disaster would have been hard to ignore. Cracks in a north-south ridge vented methane and steam. A row of trees and brush along the western boundary clung to life, a futile attempt to arrest the gas migration. All other vegetation was dead or dying. Iron staining, a dark brown, foamy substance, bubbled up and discolored the soil. Leachate seeping into gullies and streams drained into wetland areas on the site, killing aquatic species.

The south ravine contained a few crushed and buried drums interspersed with randomly strewn, uncompacted, and uncovered waste of all descriptions. A pervasive stench filled the air as trucks lumbered in, dumping their hazardous cargo.

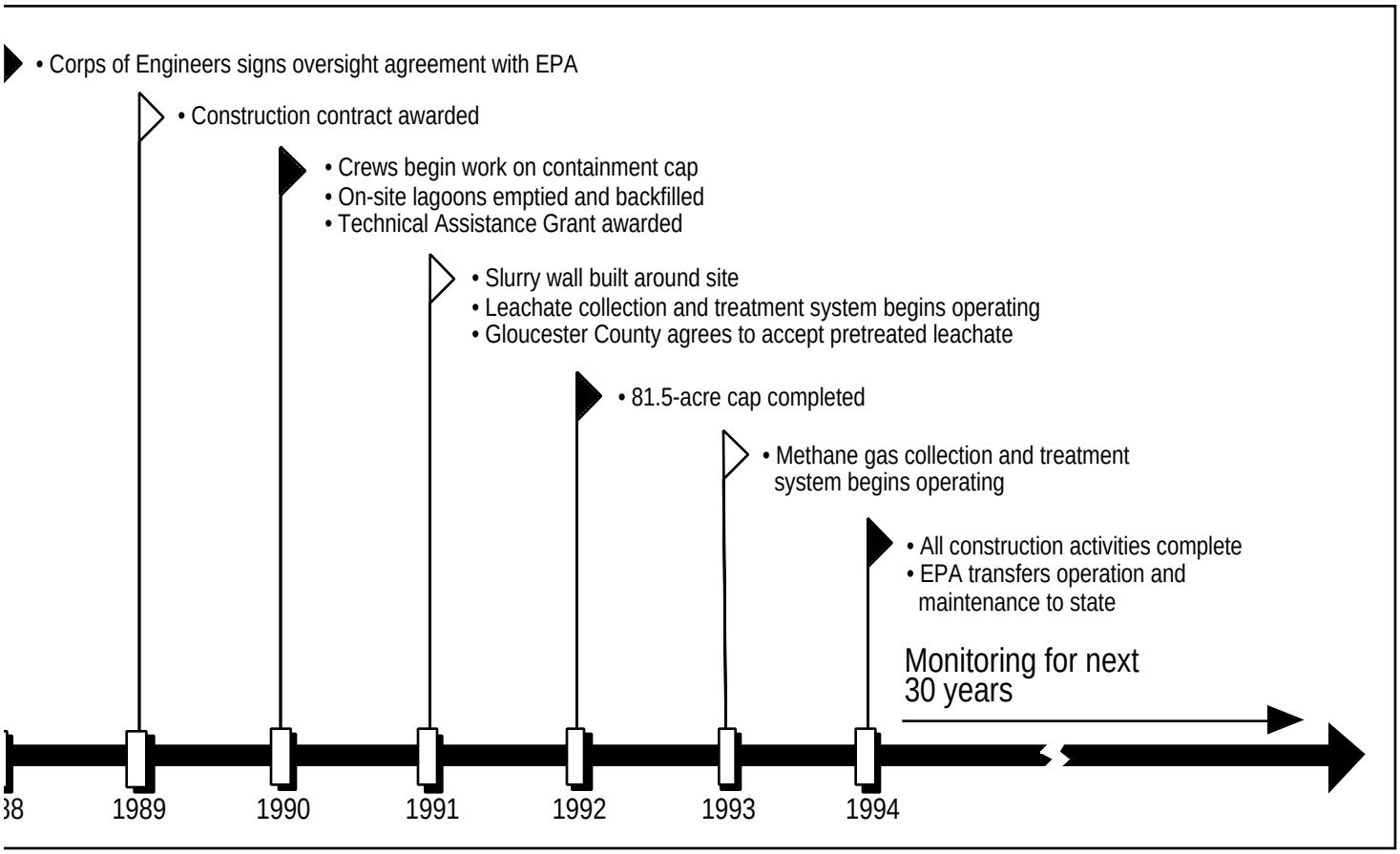
An underground fire burned for more than two months, emitting noxious fumes and soot

During approximately 17 years of operation, polluters deposited millions of cubic yards of chemical and solid waste.

Although authorities suspected illegal dumping, the magnitude of the site prevented accurate monitoring of all activities. Environmental officials faced increasing pressures as factories across the state manufactured the wonder chemicals of modern society.

CERCLA Becomes Law

This landfill was one of tens of thousands of industrial waste sites nationwide that fueled public outrage. In response, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The law established a federal program to solve the complex problems associated with improper hazardous waste disposal. Instead of using taxpayer



dollars, EPA taps a "Superfund" derived from excise taxes on chemical feedstocks and crude oil.

Local officials were unsuccessful in closing the landfill until March, 1981 when a county court finally heeded warnings of excess capacity and elevation. That summer, an underground fire erupted and burned for more than two months, emitting noxious fumes and soot.

Investigations Reveal Extensive Pollutants

When State officials asked for assistance, a Superfund team conducted preliminary sampling of air, soil, and ground water, finding dangerous levels of volatile organic compounds (VOCs) and heavy metals including lead, arsenic, and cadmium. The following July, EPA proposed to add the site to the National Priorities List (NPL) of sites requiring comprehensive cleanup.

For two years, EPA conducted exhaustive field studies to characterize the contamination at the site. By 1985, laboratory analyses revealed enormous quantities of toxic chemicals in the landfill. The sheer volume and mixture of materials prevented separate treatment technologies.

Community Organizers Get Involved

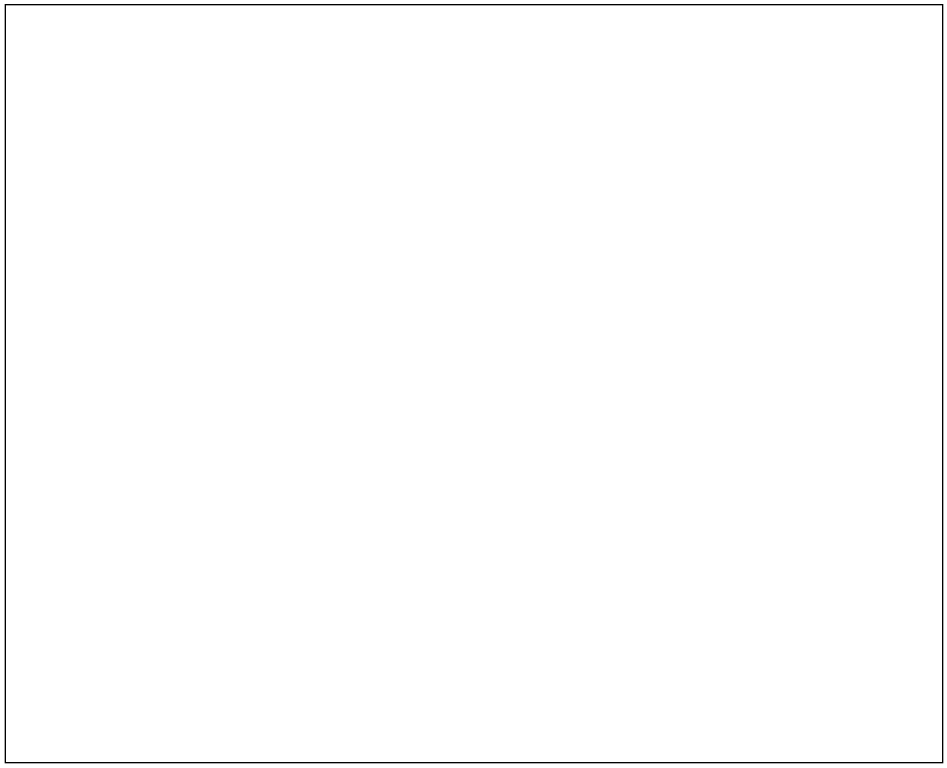
At every Superfund site, EPA invites public participation in the selection of remedy. Town meetings and comment periods present opportunities to express local preferences. With help from the community, EPA reached a decision to construct a multi-layer containment cap as a permanent solution to seal off the landfill and halt the migration of contaminants. In 1990, an area group, "NO DICE" (no dumps in clean environments), successfully acquired a Technical Assistance Grant worth $50,000 enabling a technical advisor to teach area residents about the construction process.

Largest Backhoe in the World

Two years went into designing the complex, six-layer cap built with two million tons of soil and clay. EPA asked the U.S. Army Corps of Engineers to oversee a specialty contractor who brought in the Koehring 1266, an enormous piece of earth-moving equipment that could dig 70 feet deep. Construction crews built two roller-compacted concrete retaining walls to provide the slope stability needed to construct the cap and a slurry wall which surrounds the entire site.

A roller-compacted concrete retaining wall was needed to provide slope stability before construction of the containment cap.

Agencies Cooperate on Massive Project



Raw, untreated leachate being mixed in the pretreatment facility's 350,000-gallon equalization/storage tank.

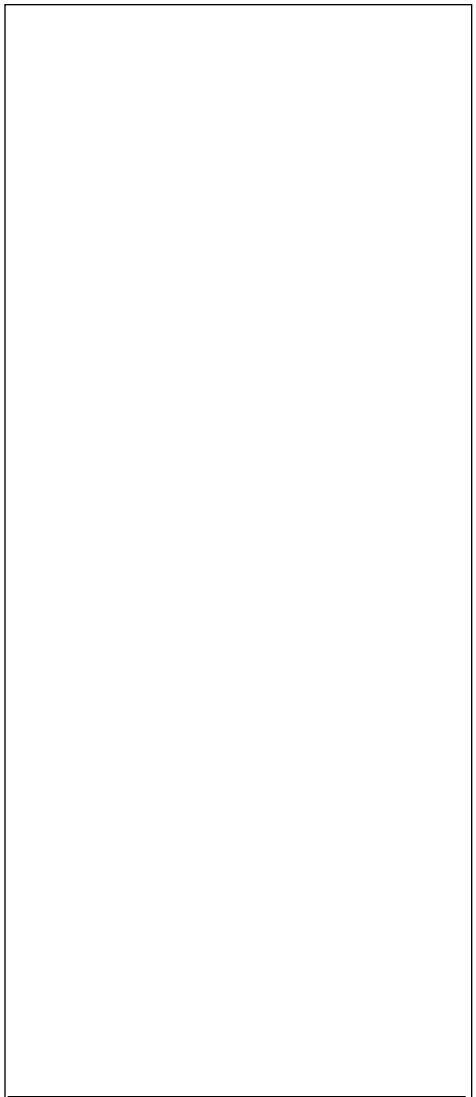
Sediments from three on-site lagoons were transferred to the landfill before capping and then backfilled with 34,000 tons of clean soil. In addition, crews built three pumping stations and a collection trench to intercept the flow of leachate into Edwards Run. Operating at a volume of 120 gallons per minute, a pretreatment facility uses chemical precipitation, air stripping, and carbon adsorption to treat leachate and ground water from the aquifer. Under an agreement with the Gloucester County Utilities Authority, pretreated ground water enters the publicly owned treatment plant for final disposal.

Unvented Gases Build Pressure

Because of the mixed composition of the buried contaminants, methane gas is released as a by-product. To stave off the potential for explosion and to prevent the cap from cracking, workers built an active gas collection and treatment system.

More than 17,500 feet of piping capture migrating gases from vertical vents. A blower draws the gases into a carbon filter to remove VOCs and the remaining methane is flared. Safety engineers monitor gas levels twice daily; air quality is measured at a nearby school and baseball field.

All construction activities were completed in June, 1993. A year later in May 1994, EPA made one of the largest federal transfers, and the first in the state, for long-term operation and maintenance. The gas and leachate collection systems and their associated treatment plants remain operational today under the care of the New Jersey Department of Environmental Protection.



42-Foot Methane Flare

Recovering Cleanup Costs From Waste Contributors

EPA identified 26 major waste contributors, including the owner, operators, and transporters, who refused to cooperate in building the containment cap or any other remedial systems. In a civil action filed by the Department of Justice, EPA is suing the parties to recover construction and other costs. Those parties have identified approximately 200 other companies and groups who they believe generated or transported hazardous wastes to the landfill. The State of New Jersey has filed a separate action to recover past costs and those associated with 30 years of future environmental monitoring.

Success at Helen Kramer

In less than six years, dedicated teams of environmental protection specialists effectively entombed a toxic landfill of enormous magnitude. Two active collection and treatment plants remain operational for contaminated ground water and methane gas. Open communication with area residents fostered public confidence and raised environmental awareness. Hard work and determination made this site a model of federal and state cooperation.

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